

**(54) ENVIRONMENTAL RESISTANT STEP INDEX TYPE OPTICAL FIBER**

(11) 1-107217 (A) (43) 25.4.1989 (19) JP  
 (21) Appl. No. 62-263945 (22) 21.10.1987  
 (71) SUMITOMO ELECTRIC IND LTD (72) MASAMOTO OOE(2)  
 (51) Int. Cl. G02B6/16, G02B6/00

**PURPOSE:** To obtain a step index type optical fiber having excellent radiation resistance by incorporating a slight amt. of fluorine only in the extreme neighborhood of the boundary of a core.

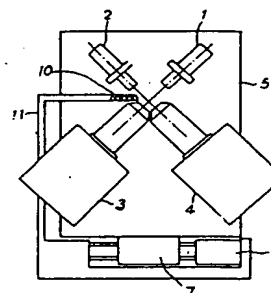
**CONSTITUTION:** This optical fiber is constituted by incorporating the slight amt. of F in only the extreme neighborhood of the surface of the core. Since the core constituted of high-purity quartz glass in the greater part of the rest is used, the characteristics of the high-purity quartz glass core are maintained and since the F exists in the extreme neighborhood of the surface of the core, a difference in viscosity in the boundary face between the core and the clad is decreased and the generation of strain at the boundary face is suppressed. An increase of transmission loss is thereby suppressed even at the time of radiation irradiation.

**(54) DEVICE FOR OBSERVING JUNCTURE OF TAPE TYPE MULTICORED OPTICAL FIBER**

(11) 1-107218 (A) (43) 25.4.1989 (19) JP  
 (21) Appl. No. 62-263983 (22) 21.10.1987  
 (71) NIPPON TELEGR & TELEPH CORP <NTT>(1)  
 (72) YOSHIHIKO NOMURA(2)  
 (51) Int. Cl. G02B6/24, G01B11/00, G01M11/00

**PURPOSE:** To measure the misalignment between the respective fibers of tape-type multicored optical fiber tapes with good accuracy by projecting the juncture of the above-mentioned optical fibers from two directions diagonally with the tape faces and magnifying and measuring the misalignments of the respective fibers by each piece with the transmission images in the respective directions.

**CONSTITUTION:** An operator drives a driving mechanism 7 by a motor 6 and moves a supporting member 5 toward the left or right while emitting light rays from light sources 1, 2 and observing the images from TV cameras 3, 4. All the optical fibers are then positioned successively by each piece on the visual axes of the TV cameras 3, 4. The images of the juncture in the upper right-lower right directions of the optical fibers can be observed with the TV camera 3 and the images of the juncture in the lower left-upper right directions can be observed with the TV camera 4 at this time. The measurement error of the misalignment is thereby decreased.



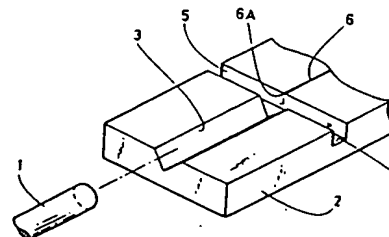
10: optical fiber, 11: supporting frame

**(54) OPTICAL FIBER CONNECTING STRUCTURE OF OPTICAL CIRCUIT SUBSTRATE**

(11) 1-107219 (A) (43) 25.4.1989 (19) JP  
 (21) Appl. No. 62-265794 (22) 21.10.1987  
 (71) BROTHER IND LTD (72) HITOMI OTOSHI(2)  
 (51) Int. Cl. G02B6/30, G02B6/12

**PURPOSE:** To minimize the dispersion and loss of the light between an optical fiber and light guide by constituting the title structure in such a manner that the optical fiber can be fixed to the light guide in tight contact therewith.

**CONSTITUTION:** This structure is constituted to connect the optical fiber 1 to a substrate 2 by using a V-groove 3 for guiding the optical fiber 1 and the 2nd groove 4 having perpendicular side faces which constitute incident faces for light. The optical fiber 1 can, therefore, be brought into tight contact with the light guide 6 and the light can be directly projected thereto. The dispersion and loss of the light in the juncture are thereby extremely minimized and the high coupling efficiency is obtd. Since the optical fiber 1 is guided by the V-groove 3, the assembly of the optical fiber 1 to the substrate 2 is easily and inexpensively executed.

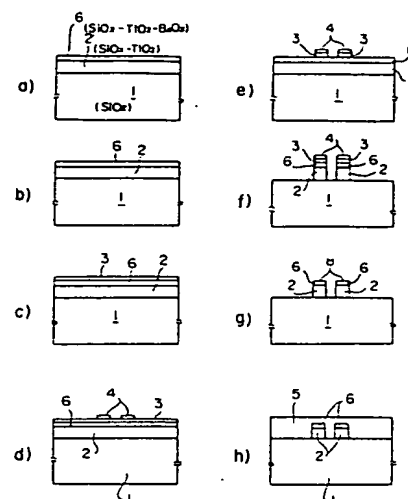


**(54) PRODUCTION OF LIGHT GUIDE**

(11) 2-33106 (A) (43) 2.2.1990 (19) JP  
 (21) Appl. No. 63-181791 (22) 22.7.1988  
 (71) HITACHI CABLE LTD (72) KATSUYUKI IMOTO  
 (51) Int. Cl.<sup>3</sup> G02B6/12, C03C17/34

**PURPOSE:** To suppress the scattering loss at a boundary to a small level by forming a film for a core on a substrate and forming a film for a clad thereon, then patterning the film for the core and forming a film having the same refractive index as the refractive index of the film for the clad over the entire surface.

**CONSTITUTION:** The glass film 2 for the core consisting of an  $\text{SiO}_2\text{-TiO}_2$  system is formed to  $8\mu\text{m}$  and the glass film 6 for the clad consisting of an  $\text{SiO}_2\text{-TiO}_2\text{-B}_2\text{O}_3$  system to  $2\mu\text{m}$  thickness on the quartz glass substrate 1 successively continuously by electron beam vapor deposition. The sample is then heat treated for 3hr in an oxygen atmosphere at  $1,200^\circ\text{C}$  to form the dense films. A  $\text{WSi}_x$  film 3 is then formed on the glass film 6 to  $1\mu\text{m}$  thickness and a photoresist film 4 is applied on the film 3. The desired patterns of the photoresist film are formed and the  $\text{WSi}_x$  film 3 is patterned by dry etching with the patterns as a mask. The glass films 6, 2 are then patterned by dry etching with the patterns of the film 3 as a mask and thereafter, the  $\text{WSi}_x$  film 3 is removed. Finally the surface is coated with the clad layer 5 having the material and refractive index equal to the material and refractive index of the glass film 6 for the clad.



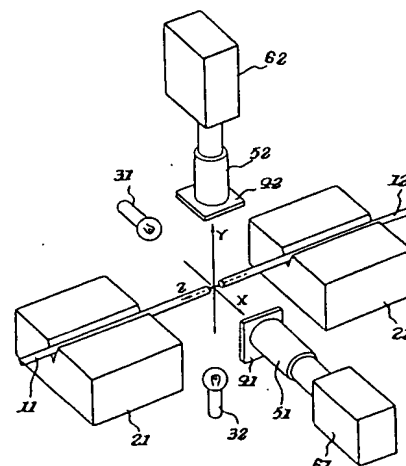
8: upper surface of clad layer

**(54) WELDING CONNECTION DEVICE FOR OPTICAL FIBER**

(11) 2-33107 (A) (43) 2.2.1990 (19) JP  
 (21) Appl. No. 63-184274 (22) 23.7.1988  
 (71) FUJIKURA LTD (72) HIROSHI ISHII(1)  
 (51) Int. Cl.<sup>3</sup> G02B6/255

**PURPOSE:** To reduce the connection loss and to improve the reliability of a connecting part by providing a filter that cuts a light beam which radiates from the vicinity of an end part of an optical fiber on an optical aligning device.

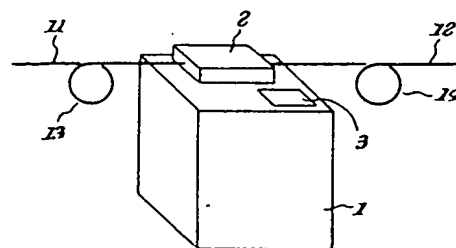
**CONSTITUTION:** End parts of two optical fibers 11, 12 are placed in V-blocks 21, 22, respectively, tip parts of the fibers 11, 12 are illuminated by lighting equipments 31, 32, and images of the end parts are magnified by magnifying glasses 51, 52 through filters 41, 42 and formed on image receiving faces of TV cameras 61, 62. Subsequently, images from two directions are reflected on a screen of a TV monitor (not shown in the figure). Even when a light beam propagates in the optical fibers 11, 12 and its light beam radiates from the vicinity of the end part, the radiated light beam is cut by the filters 41, 42, it is an undesirable influence on a core image formed through the magnifying glasses 51, 52 by the radiated light beam can be obstructed, and accordingly, the core image can be picked up clearly, and it can be executed easily to adjust the optical fibers 11, 12 by moving the V-blocks 21, 22 in the X and the Y directions and to allow them to coincide two-dimensionally.

**(54) CONNECTING METHOD FOR OPTICAL FIBER**

(11) 2-33108 (A) (43) 2.2.1990 (19) JP  
 (21) Appl. No. 63-184275 (22) 23.7.1988  
 (71) FUJIKURA LTD (72) HIROSHI ISHII  
 (51) Int. Cl.<sup>3</sup> G02B6/255

**PURPOSE:** To exactly execute the axial alignment of a core by welding and connecting optical fibers by executing the axial alignment by direct viewing of the core, while bending the optical fibers in the vicinity of a connecting point of the optical fibers.

**CONSTITUTION:** At the time of installing the respective end parts of two optical fibers 11, 12 to be connected, in a setting part 2 of an optical fiber welding and connecting device 1, the optical fibers 11, 12 are bent in the vicinity of a connecting point, for instance, in the vicinity of 200-1,000mm of the connecting point and bend parts 13, 14 are formed. In such a way, since the bend parts 13, 14 are formed, even in case of a state that a light beam propagates in these optical fibers 11, 12, it is obstructed that its light beam reaches a connecting part, and accordingly, a core can be caught clearly by tip images of the optical fibers 11, 12 reflected on a TV monitor screen 3, and while observing said images, the tips of the optical fibers 11, 12 are allowed to coincide two-dimensionally, and they can be welded and connected thereby.

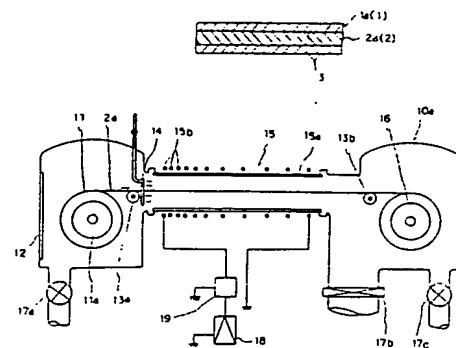


**(54) OPTICAL MEMBER AND ITS PRODUCTION**

(11) 2-37304 (A) (43) 7.2.1990 (19) JP  
 (21) Appl. No. 63-187663 (22) 27.7.1988  
 (71) MINOLTA CAMERA CO LTD (72) HIDEO YASUTOMI(3)  
 (51) Int. Cl<sup>5</sup>. G02B6/00, G02B3/00

**PURPOSE:** To allow the use of an org. material such as plastic to a central optical base material and to easily produce the optical member such as optical fiber the refractive index of which changes continuously by forming an org. plasma polymn. film the refractive index of which changes continuously and which contains at least C, H and O on the surface of the central optical base material.

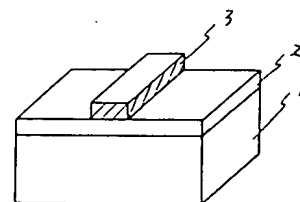
**CONSTITUTION:** The plasma polymn. film 3 the refractive index of which changes continuously is formed by a plasma polymn. method on the surface of the central optical base material 2 while the polymn. conditions are gradually changed. The continuous production of said fiber is thereby extremely facilitated and the production time is shortened; in addition, the cost thereof is drastically reduced. The formation of the org. plasma polymn. film 3 at a low temp. is enabled by the plasma polymn. method. The degradation in the characteristics of the central optical base material 2 is obviated even of the org. matter such as plastic is used for said material. Moreover, the org. plasma polymn. film 3 contg. the C, H and O has the good adhesiveness to plastic and decreases the exfoliation by bending, etc.

**(54) LIGHT GUIDE AND ITS PRODUCTION**

(11) 2-37305 (A) (43) 7.2.1990 (19) JP  
 (21) Appl. No. 63-187610 (22) 27.7.1988  
 (71) SEIKO EPSON CORP (72) KOJI YAMAZAKI  
 (51) Int. Cl<sup>5</sup>. G02B6/12//H01L27/15

**PURPOSE:** To obtain the light guide in which light can be effectively confined by laminating a clad layer consisting of a group II-VI compd. semiconductor on a substrate and a waveguide layer consisting of a group II-VI compd. semiconductor having the refractive index larger than the refractive index of the clad layer to a part on this clad layer.

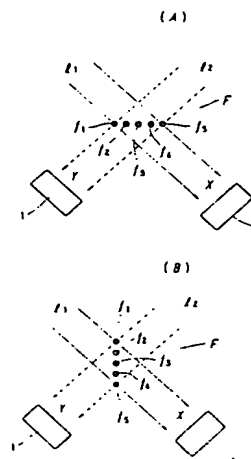
**CONSTITUTION:** This light guide has the structure composed of the GaAs substrate 1, the clad layer 2 consisting of ZnS and the waveguide 3 consisting of ZnSe. While the refractive index of the ZnSe of the waveguide 3 is 2.34, the refractive index of the ZnS of the clad layer 2 in the lower part is 2.31 and the refractive index of the upper part is 1.0, the difference in the refractive index is sufficiently large in the direction perpendicular to the boundary. The difference in the refractive index is sufficiently large in the direction parallel with the boundary as well because of the structure in which the waveguide layer 3 having 2.34 refractive index is sandwiched by the atm. of 1.0 refractive index. Since the difference in the refractive index between the waveguide layer 3 and the circumference thereof is large, the confinement of the light in the waveguide layer 3 is effectively executed.

**(54) METHOD OF INSPECTING JUNCTURE OF MULTIPLE OPTICAL FIBER**

(11) 2-37306 (A) (43) 7.2.1990 (19) JP  
 (21) Appl. No. 63-187736 (22) 27.7.1988  
 (71) FUJIKURA LTD (72) TSUTOMU ONODERA(2)  
 (51) Int. Cl<sup>5</sup>. G02B6/255

**PURPOSE:** To allow detection with high accuracy and to allow the normal/defective condition decision of connection with high reliability by irradiating the part near the butt part where coatings are removed with illumination light rays from two directions intersecting orthogonally with each other, detecting the two way components of a axial misalignment by using the two transmitted light images and making inspection.

**CONSTITUTION:** The part near the butt part of the multiple optical fiber F is irradiated with the illumination light rays  $l_1$ ,  $l_2$  from the two directions of, for example, 45° with the plane generated by the bare optical fiber arrays  $f_{1-5}$  led out near said part. The axial misalignment of the multiple optical fiber F is detected and inspected by using the two transmitted light images formed when the above-mentioned rays  $l_1$ ,  $l_2$  pass the fibers  $f_{1-5}$ . All the fiber  $f_{1-5}$  arrays of the fiber F can be observed within one screen in this way; in addition, the objective lens to be used in an image pickup device 1 system may be of a low magnification and the exact detection of the axial misalignment of the outside diameter is possible. The detection of the axial misalignment of the fiber  $f_{1-5}$  arrays from one direction by one time of focal position adjustment is possible as well.



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国際調査報告

(法8条、法施行規則第40、41条)  
[PCT18条、PCT規則43、44]

出願人又は代理人 の書類記号	今後の手続きについては、国際調査報告の送付通知様式(PCT/ISA/220) 及び下記5を参照すること。	
国際出願番号 PCT/J P 99/00445	国際出願日 (日.月.年) 03.02.99	優先日 (日.月.年) 18.03.98
出願人(氏名又は名称) 古河電気工業株式会社		

国際調査機関が作成したこの国際調査報告を法施行規則第41条(PCT18条)の規定に従い出願人に送付する。  
この写しは国際事務局にも送付される。

この国際調査報告は、全部で 3 ページである。

☐ この調査報告に引用された先行技術文献の写しも添付されている。

#### 1. 国際調査報告の基礎

a. 言語は、下記に示す場合を除くほか、この国際出願がされたものに基づき国際調査を行った。

☐ この国際調査機関に提出された国際出願の翻訳文に基づき国際調査を行った。

b. この国際出願は、ヌクレオチド又はアミノ酸配列を含んでおり、次の配列表に基づき国際調査を行った。

☐ この国際出願に含まれる書面による配列表

☐ この国際出願と共に提出されたフレキシブルディスクによる配列表

☐ 出願後に、この国際調査機関に提出された書面による配列表

☐ 出願後に、この国際調査機関に提出されたフレキシブルディスクによる配列表

☐ 出願後に提出した書面による配列表が出願時における国際出願の開示の範囲を超える事項を含まない旨の陳述書の提出があった。

☐ 書面による配列表に記載した配列とフレキシブルディスクによる配列表に記載した配列が同一である旨の陳述書の提出があった。

2. ☐ 請求の範囲の一部の調査ができない(第I欄参照)。

3. ☐ 発明の単一性が欠如している(第II欄参照)。

4. 発明の名称は ☒ 出願人が提出したものを承認する。

☐ 次に示すように国際調査機関が作成した。

5. 要約は

☒ 出願人が提出したものを承認する。

☐ 第III欄に示されているように、法施行規則第47条(PCT規則38.2(b))の規定により国際調査機関が作成した。出願人は、この国際調査報告の発送の日から1カ月以内にこの国際調査機関に意見を提出することができる。

6. 要約書とともに公表される図は、

第 14 図とする。 ☒ 出願人が示したとおりである。

☐ なし

☐ 出願人は図を示さなかった。

☐ 本図は発明の特徴を一層よく表している。

A. 発明の属する分野の分類 (国際特許分類 (IPC))  
IPC Cl. 6 G01M11/00

## B. 調査を行った分野

調査を行った最小限資料 (国際特許分類 (IPC))

IPC Cl. 6 G01M11/00, G02B6/24

最小限資料以外の資料で調査を行った分野に含まれるもの

日本国実用新案公報 1922-1996年

日本国公開実用新案公報 1971-1999年

日本国登録実用新案公報 1994-1999年

日本国実用新案登録公報 1996-1999年

国際調査で使用した電子データベース (データベースの名称、調査に使用した用語)

JOIS

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## C. 関連すると認められる文献

引用文献の カテゴリー*	引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示	関連する 請求の範囲の番号
X	JP, 9-288224, A (株式会社フジクラ、日本電信電話株式会社) 4. 11月. 1997 (04. 11. 97) ファミリーなし	1, 2, 7, 8, 13, 14, 19, 20
A		3-6, 9-12, 15-18, 21-25
A	JP, 1-107218, A (日本電信電話株式会社、エヌ・ティ・ティ技術移転株式会社) 25. 4月. 1989 (25. 04. 89) ファミリーなし	1-25
EA	JP, 11-14855, A (住友電気工業株式会社) 22. 1月. 1999 (22. 01. 99) ファミリーなし	1-25
A	JP, 2-37306, A (藤倉電線株式会社) 7. 2月. 1990 (07. 02. 90) ファミリーなし	1-25
A	JP, 2-33108, A (藤倉電線株式会社) 2. 2月. 199	

☒ C欄の続きにも文献が列挙されている。

☐ パテントファミリーに関する別紙を参照。

## \* 引用文献のカテゴリー

「A」 特に関連のある文献ではなく、一般的技術水準を示すもの

「E」 国際出願日前の出願または特許であるが、国際出願日以後に公表されたもの

「L」 優先権主張に疑義を提起する文献又は他の文献の発行日若しくは他の特別な理由を確立するために引用する文献 (理由を付す)

「O」 口頭による開示、使用、展示等に言及する文献

「P」 国際出願日前で、かつ優先権の主張の基礎となる出願

の日の後に公表された文献

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「X」 特に関連のある文献であって、当該文献のみで発明の新規性又は進歩性がないと考えられるもの

「Y」 特に関連のある文献であって、当該文献と他の1以上の文献との、当業者にとって自明である組合せによって進歩性がないと考えられるもの

「&」 同一パテントファミリー文献

国際調査を完了した日

06. 05. 99

国際調査報告の発送日

18.05.99

国際調査機関の名称及びあて先

日本国特許庁 (ISA/JP)

郵便番号 100-8915

東京都千代田区霞が関三丁目4番3号

特許庁審査官 (権限のある職員)

樋口宗彦

2W

9118

電話番号 03-3581-1101 内線 3252

C (続き): 関連すると認められる文献		
引用文献の カテゴリー*	引用文献名 及び一部の箇所が関連するときは、その関連する箇所の表示	関連する 請求の範囲の番号
A	<p>O (02. 02. 90) ファミリーなし  JP, 2-122556, A (住友電気工業株式会社) 17. 5  月. 1996 (17. 05. 96) ファミリーなし</p>	<p>1-25  1-25</p>

# PCT

## REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference  
(if desired) (12 characters maximum)

**Box No. I TITLE OF INVENTION**

OPTICAL FIBER OBSERVING IMAGE PROCESSING APPARATUS

**Box No. II APPLICANT**

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

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☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

JAPAN

State (that is, country) of residence:

JAPAN

This person is applicant  
for the purposes of:

☐

all designated  
States

☒

all designated States except the  
United States of America

☐

the United States  
of America only

☐

the States indicated in  
the Supplemental Box

**Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)**

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

KOJIMA Hidekazu  
c/o THE FURUKAWA ELECTRIC CO., LTD.  
6-1, Marunouchi 2-chome  
Chiyoda-ku, Tokyo 100-0005 Japan

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box  
is marked, do not fill in below.)

State (that is, country) of nationality:

JAPAN

State (that is, country) of residence:

JAPAN

This person is applicant  
for the purposes of:

☐

all designated  
States

☐

all designated States except  
the United States of America

☒

the United States  
of America only

☐

the States indicated in  
the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

**Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The person identified below is hereby/has been appointed to act on behalf  
of the applicant(s) before the competent International Authorities as:

☒

agent

☐

common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

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☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box No. III		<b>FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)</b>	
<i>If none of the following sub-boxes is used, this sheet should not be included in the request.</i>			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i> MISHIMA Seiryō c/o THE FURUKAWA ELECTRIC CO., LTD. 6-1, Marunouchi 2-chome Chiyoda-ku, Tokyo 100-0005 Japan		This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State <i>(that is, country)</i> of nationality: JAPAN		State <i>(that is, country)</i> of residence: JAPAN	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State <i>(that is, country)</i> of nationality:		State <i>(that is, country)</i> of residence:	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State <i>(that is, country)</i> of nationality:		State <i>(that is, country)</i> of residence:	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State <i>(that is, country)</i> of nationality:		State <i>(that is, country)</i> of residence:	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
Name and address: <i>(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)</i>		This person is: <input type="checkbox"/> applicant only <input type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only <i>(If this check-box is marked, do not fill in below.)</i>	
State <i>(that is, country)</i> of nationality:		State <i>(that is, country)</i> of residence:	
This person is applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box			
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on another continuation sheet.			



**Box No. V DESIGNATION OF STATES**

The following designations are hereby made under Rule 4.9(a) (*mark the applicable check-boxes; at least one must be marked*):

**Regional Patent**

- ☐ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (*if other kind of protection or treatment desired, specify on dotted line*) .....

**National Patent** (*if other kind of protection or treatment desired, specify on dotted line*):

- |   |   |
|---|---|
| <input type="checkbox"/> AL Albania .....                               | <input type="checkbox"/> LS Lesotho .....                                   |
| <input type="checkbox"/> AM Armenia .....                               | <input type="checkbox"/> LT Lithuania .....                                 |
| <input type="checkbox"/> AT Austria .....                               | <input type="checkbox"/> LU Luxembourg .....                                |
| <input type="checkbox"/> AU Australia .....                             | <input type="checkbox"/> LV Latvia .....                                    |
| <input type="checkbox"/> AZ Azerbaijan .....                            | <input type="checkbox"/> MD Republic of Moldova .....                       |
| <input type="checkbox"/> BA Bosnia and Herzegovina .....                | <input type="checkbox"/> MG Madagascar .....                                |
| <input type="checkbox"/> BB Barbados .....                              | <input type="checkbox"/> MK The former Yugoslav Republic of Macedonia ..... |
| <input type="checkbox"/> BG Bulgaria .....                              | <input type="checkbox"/> MN Mongolia .....                                  |
| <input type="checkbox"/> BR Brazil .....                                | <input type="checkbox"/> MW Malawi .....                                    |
| <input type="checkbox"/> BY Belarus .....                               | <input type="checkbox"/> MX Mexico .....                                    |
| <input checked="" type="checkbox"/> CA Canada .....                     | <input type="checkbox"/> NO Norway .....                                    |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein .....  | <input type="checkbox"/> NZ New Zealand .....                               |
| <input type="checkbox"/> CN China .....                                 | <input type="checkbox"/> PL Poland .....                                    |
| <input type="checkbox"/> CU Cuba .....                                  | <input type="checkbox"/> PT Portugal .....                                  |
| <input type="checkbox"/> CZ Czech Republic .....                        | <input type="checkbox"/> RO Romania .....                                   |
| <input type="checkbox"/> DE Germany .....                               | <input type="checkbox"/> RU Russian Federation .....                        |
| <input type="checkbox"/> DK Denmark .....                               | <input type="checkbox"/> SD Sudan .....                                     |
| <input type="checkbox"/> EE Estonia .....                               | <input type="checkbox"/> SE Sweden .....                                    |
| <input type="checkbox"/> ES Spain .....                                 | <input type="checkbox"/> SG Singapore .....                                 |
| <input type="checkbox"/> FI Finland .....                               | <input type="checkbox"/> SI Slovenia .....                                  |
| <input type="checkbox"/> GB United Kingdom .....                        | <input type="checkbox"/> SK Slovakia .....                                  |
| <input type="checkbox"/> GE Georgia .....                               | <input type="checkbox"/> SL Sierra Leone .....                              |
| <input type="checkbox"/> GH Ghana .....                                 | <input type="checkbox"/> TJ Tajikistan .....                                |
| <input type="checkbox"/> GM Gambia .....                                | <input type="checkbox"/> TM Turkmenistan .....                              |
| <input type="checkbox"/> HR Croatia .....                               | <input type="checkbox"/> TR Turkey .....                                    |
| <input type="checkbox"/> HU Hungary .....                               | <input type="checkbox"/> TT Trinidad and Tobago .....                       |
| <input type="checkbox"/> ID Indonesia .....                             | <input type="checkbox"/> UA Ukraine .....                                   |
| <input type="checkbox"/> IL Israel .....                                | <input type="checkbox"/> UG Uganda .....                                    |
| <input type="checkbox"/> IS Iceland .....                               | <input checked="" type="checkbox"/> US United States of America .....       |
| <input type="checkbox"/> JP Japan .....                                 | <input type="checkbox"/> UZ Uzbekistan .....                                |
| <input type="checkbox"/> KE Kenya .....                                 | <input type="checkbox"/> VN Viet Nam .....                                  |
| <input type="checkbox"/> KG Kyrgyzstan .....                            | <input type="checkbox"/> YU Yugoslavia .....                                |
| <input type="checkbox"/> KP Democratic People's Republic of Korea ..... | <input type="checkbox"/> ZW Zimbabwe .....                                  |
| <input checked="" type="checkbox"/> KR Republic of Korea .....          |   |
| <input type="checkbox"/> KZ Kazakhstan .....                            |   |
| <input type="checkbox"/> LC Saint Lucia .....                           |   |
| <input type="checkbox"/> LK Sri Lanka .....                             |   |
| <input type="checkbox"/> LR Liberia .....                               |   |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐ .....
- ☐ .....

**Precautionary Designation Statement:** In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except the designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (*Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.*)

<b>Box No. VI PRIORITY CLAIM</b>					<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:			
		national application: country	regional application: * regional Office	international application: receiving Office	
item (1) 18.03.98	10-68596	JAPAN			
item (2)					
item (3)					

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): (1)

\* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

<b>Box No. VII INTERNATIONAL SEARCHING AUTHORITY</b>		
<b>Choice of International Searching Authority (ISA)</b> (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):  ISA / <u>JP</u>	<b>Request to use results of earlier search: reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):</b>  Date (day/month/year)      Number      Country (or regional Office)	

<b>Box No. VIII CHECK LIST; LANGUAGE OF FILING</b>	
This international application contains the following number of sheets: request : 4 description (excluding sequence listing part) : 34 claims : 16 abstract : 1 drawings : 26 sequence listing part of description : Total number of sheets : 81	This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet <input checked="" type="checkbox"/> paper with patent stamp equivalent to the fee <input checked="" type="checkbox"/> paper proving fee was paid to the International Office Account 2. <input type="checkbox"/> separate signed power of attorney 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input checked="" type="checkbox"/> other (specify): priority document mailing request

<b>Figure of the drawings which should accompany the abstract:</b> 14	<b>Language of filing of the international application:</b>
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<b>Box No. IX SIGNATURE OF APPLICANT OR AGENT</b>	
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).  <div style="text-align: center;">KOBAYASHI Masaharu</div>	

For receiving Office use only

1. Date of actual receipt of the purported international application:  3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:  4. Date of timely receipt of the required corrections under PCT Article 11(2):  5. International Searching Authority (if two or more are competent): <u>ISA /</u>	2. Drawings:  <input type="checkbox"/> received:  <input type="checkbox"/> not received:  6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid
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Date of receipt of the record copy by the International Bureau:	
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